

Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 1 081 692 A3**

(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
11.12.2002 Bulletin 2002/50

(51) Int Cl.7: **G11B 7/135, G02B 3/04**

(43) Date of publication A2:
07.03.2001 Bulletin 2001/10

(21) Application number: **00118627.9**

(22) Date of filing: **28.08.2000**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

(72) Inventors:
• **Ota, Kohei, c/o Konica Corporation
Hachioji-shi, Tokyo (JP)**
• **Kimura, Tohru, c/o Konica Corporation
Hachioji-shi, Tokyo (JP)**

(30) Priority: **01.09.1999 JP 24729499**
06.03.2000 JP 2000060843

(74) Representative: **Henkel, Feiler, Hänzeli
Möhlstrasse 37
81675 München (DE)**

(71) Applicant: **KONICA CORPORATION
Tokyo (JP)**

(54) **Objective lens for pickup and light pickup apparatus**

(57) An objective lens for use in an optical pickup apparatus to record or reproduce information in an optical information recording medium, comprises an aspheric surface, wherein the following conditional formula is satisfied: $1.1 \leq d1/f \leq 3$ where $d1$ represents axial lens thickness and f represents a focal length.

FIG. 1 (a)

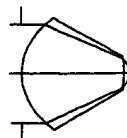
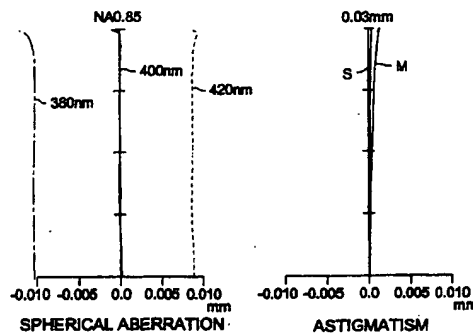


FIG. 1 (b)



EP 1 081 692 A3



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 11 8627

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 5 880 893 A (SUGANUMA HIROSHI) 9 March 1999 (1999-03-09)	1-8, 10-14, 16-26, 28,29, 31,40,41	G11B7/135 G02B3/04
Y	* column 1, line 43 - line 58; figures 1-3,10,13,16,19; examples 1-4 * * column 2, line 22 - line 28 * * column 15, line 33 - line 47 * ---	9,27, 32-39	
X	US 4 828 373 A (SUDA SHIGEYUKI ET AL) 9 May 1989 (1989-05-09) * abstract; figure 1; examples 1-3 * ---	1,5-8, 12-14, 20, 24-26, 40,41	
X	US 4 768 867 A (SUDA SHIGEYUKI) 6 September 1988 (1988-09-06) * abstract; figure 1; tables 1A-10B * ---	1,5-8, 12-14, 20, 24-26, 40,41	TECHNICAL FIELDS SEARCHED (Int.Cl.7) G11B G02B
X	US 4 765 723 A (TAKAMURA SACHIKO) 23 August 1988 (1988-08-23) * abstract; figures 1-7; tables 1-18 * ---	1,5-8, 12,14, 15,20, 24-26, 30,40,41	
X	US 4 415 238 A (BRAAT JOSEPHUS J M ET AL) 15 November 1983 (1983-11-15) * the whole document * --- -/--	1,5,6, 15,20, 24,25, 30,40,41	
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 18 October 2002	Examiner Hermann, R
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

EPO FORM 1503 (03.02) (P04001)



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 11 8627

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
P,X	JP 2000 035535 A (KONICA CORP) 2 February 2000 (2000-02-02) * figures 1,3; tables 1-5 * ---	1-3,5,6, 13,14, 17,18, 20,21, 24,25, 40,41	
P,X	JP 2000 028916 A (KONICA CORP) 28 January 2000 (2000-01-28) * figures 1,4,7,10; tables 1-4 * ---	1-8, 13-18, 20-26, 30-33, 40,41 34-39	
Y	US 4 909 616 A (ARAI NORIKAZU) 20 March 1990 (1990-03-20) * the whole document * ---	32-39	
Y	NARAHARA T ET AL: "OPTICAL DISC SYSTEM FOR DIGITAL VIDEO RECORDING" JAPANESE JOURNAL OF APPLIED PHYSICS, PUBLICATION OFFICE JAPANESE JOURNAL OF APPLIED PHYSICS. TOKYO, JP, vol. 39, no. 2B, PART 1, 11 July 1999 (1999-07-11), pages 912-919, XP001005912 ISSN: 0021-4922 * abstract * --- -/-	9,27	
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 18 October 2002	Examiner Hermann, R
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons A : member of the same patent family, corresponding document	

EPO FORM 1503 03.82 (P04C01)

EP 1 081 692 A3



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 11 8627

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	<p>TANAKA Y ET AL: "LENS AND OPTICS FOR OPTICAL DISK SYSTEM"</p> <p>JAPANESE JOURNAL OF APPLIED PHYSICS, PUBLICATION OFFICE JAPANESE JOURNAL OF APPLIED PHYSICS. TOKYO, JP, vol. 26, no. SUPPL 26-4, 1987, pages 121-126, XP000005655</p> <p>ISSN: 0021-4922</p> <p>* the whole document *</p> <p>-----</p>	1-41	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 18 October 2002	Examiner Hermann, R
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone</p> <p>Y : particularly relevant if combined with another document of the same category</p> <p>A : technological background</p> <p>O : non-written disclosure</p> <p>P : intermediate document</p>		<p>T : theory or principle underlying the invention</p> <p>E : earlier patent document, but published on, or after the filing date</p> <p>D : document cited in the application</p> <p>L : document cited for other reasons</p> <p>& : member of the same patent family, corresponding document</p>	

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 00 11 8627

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

18-10-2002

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
US 5880893	A	09-03-1999	JP	10104507 A	24-04-1998
US 4828373	A	09-05-1989	JP	60120310 A	27-06-1985
US 4768867	A	06-09-1988	JP	62054211 A	09-03-1987
			JP	62054212 A	09-03-1987
			DE	3629875 A1	05-03-1987
US 4765723	A	23-08-1988	JP	62251709 A	02-11-1987
			JP	62108217 A	19-05-1987
US 4415238	A	15-11-1983	NL	8103323 A	01-02-1983
			AU	8577782 A	20-01-1983
			BE	893826 A1	12-01-1983
			CA	1186927 A1	14-05-1985
			DE	3226019 A1	20-01-1983
			ES	513851 D0	16-04-1983
			ES	8305939 A1	16-07-1983
			FR	2509478 A1	14-01-1983
			IT	1151992 B	24-12-1986
			JP	1695542 C	17-09-1992
			JP	3060406 B	13-09-1991
			JP	58017409 A	01-02-1983
JP 2000035535	A	02-02-2000	US	6349083 B1	19-02-2002
JP 2000028916	A	28-01-2000	US	6349083 B1	19-02-2002
US 4909616	A	20-03-1990	JP	8007329 B	29-01-1996
			JP	62269922 A	24-11-1987